

**RIDE PERFORMANCE OF AN ARTICULATED PASSENGER TRAIN**

*Institute of Technical Mechanics  
of the National Academy of Sciences of Ukraine and the State Space Agency of Ukraine  
15 Leshko-Popel St., Dnipro 49005, Ukraine; e-mail: dep7@ukr.net*

The importance of this work stems from the need for renewing the home rolling stock and integrating it into the European market of transport services. The introduction of speedy train operation calls for increased attention to theoretical studies aimed at ride performance improvement. The analysis of passenger traffic safety for home and European tracks of different and geometries calls for assessing the ride performance of passenger trains. In doing so, steady and transient traffic conditions must be considered. This approach to theoretical studies allows one to improve the safety indices of speedy passenger trains. This paper presents the results of theoretical evaluation of the ride performance of an articulated and a standard passenger train. The cars of both trains are equipped with wheels of different profiles used on the Ukrainian and European railways. An assessment of the predicted dynamic performance of the articulated passenger train shows that its cars demonstrate a better ride performance, thus improving passenger comfort and train operating safety throughout the allowable speed range in normal conditions. It is undesirable for such trains to move in curves of small and medium radius. In addition, the articulated train cost is lower than the traditional train one because of a lower number of trucks. The ride performance is also assessed for cars whose wheels are compatible with different rail profiles, which allows them to be used both on the Ukrainian and on the European railways. As shown by calculations, the universal wear-resistant wheel profile does not impair the car ride performance of the trains considered. better ride performance.

**Keywords:** articulated passenger train, train operating safety, ride performance.

1. Markova O., Kovtun H., Maliy V. Mathematical modeling of articulated passenger train spatial vibrations. Teh. Meh. 2021. No. 2. Pp. 91 - 99. <https://doi.org/10.15407/itm2021.02.091>
2. Haque I., Nagurka M. Modelling and linear analysis of high-speed articulated trainsets. Int. J. of Vehicle Design. 2001. V. 26. Nos. 2/3. Pp. 249-263. <https://doi.org/10.1504/IJVD.2001.001942>
3. Norms to Calculate and Design Cars for 1520 mm Gauge Railways. Moscow: GosNIIV-VNIIZHT, 1996. 319 pp. (in Russian).
4. Mokrii T. F., Malysheva I. Yu., Lapina L. G., Bezrukavii N. V. Passenger car wheel profile for the operation on the Ukrainian and European railways. Teh. Meh. 2022. No. 4. Pp. 111-120. (in Ukrainian). <https://doi.org/10.15407/itm2022.04.111>

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